

FINAL REPORT

**LEVEL OF NEED FUNDED
COST MODEL**

INDIAN HEALTH SERVICE

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*I&M Technologies Inc.
&
Center for Health Policy Studies*

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EXECUTIVE SUMMARY

The Indian Health Service (IHS) calculates the Level of Need Funded (LNF) to assess the adequacy of health care funding for eligible American Indians and Alaska Natives. The LNF calculation is the primary method used by IHS to measure the adequacy of health care funding. LNF is the ratio of appropriated IHS funds, to the funds needed by the eligible population for health care services. For example, a current year LNF ratio of 0.5 would indicate that appropriated dollars provided 50% of the health care services needed by the population.

Historically, LNF has been calculated using IHS statistics on population, use, facilities, staffing, and costs. Indian Tribal Governments have been critical of the budget and cost driven approach taken to calculate LNF. As a result, Congress directed IHS to identify a technically acceptable method for estimating need in order to calculate the level of need funded. IHS organized an LNF Work Group with representatives from all twelve IHS Areas, to guide the development of a new LNF methodology. The LNF Committee selected parity with other Americans as an appropriate standard for calculating the need for health care services for the AI/AN population. This standard is summarized by a simple question:

What would it cost to provide a mainstream health insurance plan to the American Indian and Alaska Native population?

Parity with other Americans focused the LNF calculation on market driven rather than budget driven factors. Selection of a market driven target required actuarial methods to perform the analysis.

This report presents an LNF actuarial analysis for personal health care services using the cost of mainstream health insurance as its standard for the Level of Need. The Federal Employees Health Benefits Program (FEHBP) was selected as the starting point for the calculation. Average FEHBP premium per insured individual shows the level of costs the federal government can feasibly achieve via competition among plans. (In addition, two independent sources of data verify that the FEHBP average premium is close to the average for all U.S. private plans.) The value of copayments and deductibles was added to the premium, based on an actuarial model of the largest plan within FEHBP. Costs (premium plus copayments and deductibles) were inflated to account for the impact of the over-65 population on health spending. Following this, costs were adjusted downward to account for the age, sex, health status and rural location of the American Indian and Alaska Native population. Finally, all sources and uses of health care funds were taken into account. Sources of funds include both Federal and private insurers. Uses of funds include personal health care and other services.

The LNF actuarial calculation for the IHS-eligible population indicates a Level of Need Funded of only 54%. After taking all factors into consideration, the current IHS budget for personal health care services falls short of parity with other Americans by an estimated 46%. Current funding is not sufficient to provide eligible American Indians and Alaska Natives with services equivalent to the coverage offered by a mainstream health insurance plan.

A series of sensitivity analyses demonstrate that this is a robust finding. These sensitivity analyses include:

- Choosing the 25th percentile of FEHBP premiums as the baseline rather than the average FEHBP premium, a 22 percent reduction in premium cost.
- Doubling the estimated cost reduction due to age-sex-risk adjustment.
- Doubling the estimated cost reduction due to rural location of the AI/AN population.
- Increasing payments by other insurers from 25 percent to 35 percent of costs.

In each case, any single plausible change in assumptions produced an LNF of 0.66 or less for the eligible population. This suggests that any reasonable comparison will show IHS funding well below the level required to provide the AI/AN population with health care benefits equivalent to mainstream health insurance.

§1. BACKGROUND

The Indian Health Service budget provides for a comprehensive health care system that includes personal health care services, sanitation, facilities, disease prevention, and public health services for the eligible AI/AN population. The current IHS appropriation is approximately \$2.1 billion. In addition, the budget is supplemented by about \$0.3 billion in collections from Medicaid, Medicare, and private insurers, for services delivered in IHS facilities to insured individuals. In 1995, the population eligible to use IHS care was about 1.5 million individuals. Of this number, nearly 1.3 million actually received IHS care during a prior three-year period (IHS 1997a, IHS 1997b).

The Indian Health Service periodically estimates the amount of money needed to serve the health care needs of the AI/AN population in each Area. The level of need estimated is then compared to the amount of funds available to form a ratio called the *Level of Need Funded* (LNF). An LNF ratio of 0.5, for example, would mean that money is available to pay for half of the estimated health care needs of the eligible population. LNF is important because it is a major determinant of the level of service and IHS funding received by the eligible population. A low LNF means that there is significant risk of unmet health care need in the population. By contrast, in other Federal entitlement programs such as Medicare; care is never limited by the Federal funds budgeted. Beneficiaries continue to receive medically necessary services because they have that right. As a result, it is possible to estimate the Medicare budget by use of care. Medicare funding does not require an elaborate LNF calculation. For the IHS, the reverse is true because care is rationed by a budget that does not permit delivery of medically necessary services, beyond the IHS appropriation. This Anti-deficiency Act limitation makes an LNF type of calculation necessary in order to estimate financing for the delivery of care.

Prior LNF estimates suggest that the Indian Health Service is funding about half of the health care needs of the AI/AN population. The three most recent Level of Need Funded estimates by IHS were 66.5%, 55.6%, and 46.9% using data from 1993, 1994, and 1996 respectively (IHS 1998a). These estimates were made at a time when IHS spending in real, inflation-adjusted terms was nearly constant; yet the covered population was growing by about 2 percent per year (IHS 1997b).

Prior LNF calculations have been criticized for being difficult to understand; not subject to independent verification; and too reflective of use, as opposed to need for care. Historically, IHS determined the eligible population's level of need by examining its own statistics on staffing, facilities, population, use, and costs. Norms for factors such as physicians or hospital beds per capita were translated into overall required levels of spending. Few outside IHS had the expertise to understand the methods and the underlying data. LNF became a "black box" to the Congress and to the Tribes. Recognizing the shortcomings of the prior approach, Congress directed IHS to find a better and more acceptable method. IHS set a goal to develop a technically accurate and objectively defensible methodology for estimating the Level of Need Funded.

IHS assembled an LNF Work Group committee, with representation from each of the 12 IHS Areas. The work group considered the issues and determined that the most reasonable goal for AI/AN health care was comparability with other Americans. In a practical sense, saw the LNF as answering a simple question: *What would it cost to give the AI/AN population a typical, mainstream health insurance plan?* For example, what would it cost to provide a package of services equivalent to that enjoyed by Federal employees who are enrolled in the Federal Employees Health Benefits Program (FEHBP)? This new approach to the LNF replaced the internal, budget driven methods with an external, market driven standard - private health care costs.

IHS contracted with I&M Technologies Inc. and the Center for Health Policy Studies to assist the LNF Work Group to answer the question of comparability. Mindful of the deficiencies in the older LNF cost model, the LNF Work Group focused on developing an LNF estimate that would:

- Rely on publicly-available data sources;
- Use industry-standard methods;
- Tie to a typical or standard level of benefits; and
- Be easily understood.

The primary objective of this study is to estimate the cost of providing a mainstream health insurance plan to the AI/AN population, and to compare this estimate to the IHS budget. The end result will be a set of LNF estimates for the country, for different subsets of the AI/AN population, and to the extent possible, for smaller geographic areas such as IHS areas or service units.

§2. METHODS AND FINDINGS – United States

This section presents a summary of methods and findings for LNF for the U.S. as a whole. Methods and results are presented in enough detail to enable the reader to follow the flow of calculations. Detailed information on data and methods is available in §5 of this report.

§2.1 Introduction: An Approximate Calculation

An approximate calculation shows that IHS funding per person is well below the U.S. average health care cost per capita. In 1987, health care spending in the United States averaged nearly \$4,000 (calculated from Levit et.al., 1997). The IHS budget for this same period was less than \$1,500 per eligible individual (calculated from IHS 1997b).

While a calculation of this type is suggestive, it is open to easy criticism for a number of reasons. A few examples show that in-depth analysis is needed.

- US and IHS statistics do not reflect the same package of benefits. For example, about 8 percent of U.S. health care spending is for long-term care, an item not covered by IHS spending. Conversely, a substantial fraction of IHS spending is for items other than personal health care, such as water and sewer infrastructure.

- US and IHS statistics are not adjusted for population differences. For example, the AI/AN population is much younger on average, than is the U.S. population; but it has higher rates of morbidity and mortality (see below).
- US and IHS statistics do not reflect the same proportion of spending. For example, US data reflect all spending. IHS data only reflect a part of spending for the AI/AN population; with the remainder being covered by Medicaid, Medicare, and private insurance.

§2.2 Actuarial Calculation of the Level of Need

In this section a series of actuarial calculations are made. These calculations estimate the level of need for several cohorts of the AI/AN population. The Level of Need is the estimated cost of providing a mainstream health insurance package to the AI/AN population. The calculation proceeds in two parts. First, the total cost of a mainstream health insurance plan is estimated. In this case, estimates are keyed to the Blue Cross Blue Shield Standard Option plan under the FEHB program. Second, significant adjustments are made for age, health status, and location between the AI/AN and U.S. populations.

The actuarial calculation proceeds in several steps:

- Calculate the average cost per person for private health insurance
 - 2.2.1 Calculate FEHB health insurance premium per covered life.
 - 2.2.1 Adjust for the over-65 population covered by Medicare
 - 2.2.2 Add in the average value of copayments and deductibles.
- Adjust for characteristics of the AI/AN population
 - 2.2.3 Define the AI/AN population cohorts to be covered.
 - 2.2.4 Adjust for age, health status of AI/AN population.
 - 2.2.5 Adjust for rural location of AI/AN population
 - 2.2.6 Calculate Level of Need as adjusted cost of private health insurance.

§2.2.1 Average Private Premium per Insured Person.

The first step in this analysis begins with 1997 information on costs and enrolled population for the Federal Employees Health Benefits Program FEHBP (OPM 1998). This information, along with estimated premium inflation from 1997 to 1999, provide an estimate of 1999 FEHP premium per covered individual (subscribers and their dependents). Two other estimates of average private premiums were calculated from publicly available sources to evaluate the robustness of the FEHBP premium estimate. National health spending data on payments by insurers, insurance overhead costs, and individuals covered provides a second reference point. Federal Office of Personnel Management (OPM) estimates of average private premium are a third reference.

These three sources of data give similar estimates of premium per person. The remainder of the analysis uses \$2,100 per covered life as the average private premium, a number which is at the low end of the estimates. Details of the calculation are presented in §5.2.

	<i>Premium per Person for Under-65 Population</i>
Estimated for all Federal employees and dependents FEHBP	\$2,139
Estimated from National Health Spending data	\$2,310
Estimated from statistics on average private premium	\$2,108
Benchmark for remainder of calculation	\$2,100

A separate adjustment is needed to account for the health care spending on the elderly. Nearly all elderly individuals have Medicare coverage, and private health insurance costs (such as FEHBP premiums) reflect only the costs not covered by Medicare. Data from the *National Medical Expenditures Survey* (NMES) were used to estimate the ratio of spending for elderly and non-elderly Americans. The resulting ratio was used to calculate a premium equivalent for the entire (elderly and non-elderly) population.

The elderly have a large impact on average premium because their spending is more than four times the average for the under-65 population. They must be included in the calculation because the IHS is responsible for (and pays for) the health care of some portion of the elderly AI/AN population. Other parts of the calculation (age-sex adjustment; estimates of care paid outside the IHS budget) will account for the differential impact that the elderly have on IHS costs.

<i>Population</i>	<i>Premium Per person</i>
Average premium for under-65 population	\$2,100
Estimated premium for entire population including elderly	\$2,833
Benchmark for remainder of calculation	\$2,833

§2.2.2 Average Deductible and Copayment Amounts.

The second step of the analysis adds the cost of copayments and deductibles to the estimate. The LNF Committee was clear that these amounts must be included in the baseline estimate, with the understanding that by Treaty, statute, and judicial decision, the United States provides health care services as a Trust Responsibility, free of charge to the eligible AI/AN population.

The largest plan offered to Federal employees was taken as the model for this calculation. The Blue Cross Blue Shield (BCBS) Federal Employees Plan (FEHBP) *standard option benefit* was used to model copayment and deductible liabilities. BCBS claims a 43 percent share of FEHBP enrollment, and the standard option is its largest plan (FEP 1999a). A current and complete description of the 1999 benefits package was obtained from the FEHBP website (FEP 1999b).

Copayment and deductible liabilities were estimated by modeling the FEP standard option benefit package, using NMES spending data inflated to 1999 levels. Computer programs calculated individual and family deductible and stop-loss provisions, copayment amounts, and total costs for non-covered services. The resulting estimate for the under-65 population was inflated to give an estimate for the entire (under- and over-65) population.

Two aspects of this calculation are worth noting. First, these amounts reflect current patterns of use, not the higher levels of use that might be expected if copayments and deductibles were no longer paid out-of-pocket. Second, variation in copayment and deductible amounts provides essentially all the variation in the actuarial value of private health insurance plans. As shown in §5.6, once it is stipulated that individuals will pay no deductible or copayment amounts, all typical private plans offer nearly identical actuarial value. The only exception is for plans offering long-term care as a covered benefit.

	<i>Cost per person, Under-65 population U.S. population</i>	<i>Cost per person, Total U.S. population Including Elderly</i>
Premium	\$2,100	\$2,833
Deductibles and copayments	\$ 414	\$ 558
Total (premium plus copayments)	\$2,514	\$3,391
Benchmark for remainder of calculation		\$3,391

§2.2.3 Define AI/AN Population Cohorts

The LNF Committee required analysis of four distinct cohorts within the AI/AN population. These cohorts are: *Users*, *Eligibles*, *Urban Indians*, and *All Other AI/AN* population. IHS defines *Users* as individuals who have used any IHS health care service during the past three years. Counts of such individuals are derived from the IHS patient registry and reflect a de-duplicated count of individuals. For 1999, the count is estimated to be approximately 1.34 million individuals.

IHS defines the *Eligibles* population cohort as AI/AN individuals living within IHS or Tribal service areas (on or near Reservations). This count reflects self-reported race from 1990 Census data, updated by IHS staff using vital statistics (births and deaths) data. For 1999, this population is estimated to be 1.47 million individuals.

IHS defines the *Urban Indian* population cohort as AI/AN individuals living within the Metropolitan Statistical Areas (MSAs) served by an Urban Indian project. This population count is also based on Census data. For purposes of this study, only those individuals not already counted in the service population were included. Under this definition, the 1999 Urban Indian population was projected at 0.33 million individuals.

IHS defines the *All Other AI/AN* population cohort as those individuals who self-reported themselves to be AI/AN in 1990 Census data (updated using vital statistics information), and who live outside of an IHS service area or MSA served by an Urban Indian project. The All

Other AI/AN population cohort was estimated at 0.64 million individuals in 1999. The sum of Eligibles, Urban Indians, and All Other populations total 2.44 million individuals for 1999. By contrast, the IHS User population is 1.34 million individuals.

This analysis focuses primarily on the User and Eligible populations because these populations are actually served by the IHS, are directly relevant to a discussion of current IHS funding, and have an information base that can support analysis. Technically, these are the cohorts for which the most information is known. In particular, the 1987 *Survey of American Indians and Alaska Natives* (SAIAN) provides a detailed snapshot of health status for the User and Eligible populations. Unfortunately, only basic demographic and vital statistics information is known about the other cohorts. In general, detailed analyses developed for the User and Eligible populations are extrapolated to the other populations where possible. Cost estimates for the Urban and All Other populations are derived from simple age-adjusted extrapolations of the data for the User and Eligible populations.

<i>Population Cohort</i>	<i>Estimated 1999 Population (Millions)</i>
Users (users of IHS services in last three years)	1.34
Eligibles (AI/AN population living in IHS service areas)	1.47
Urban (AI/AN population in cities with Urban Indian projects)	0.33
All other AI/AN population	0.64

§2.2.4 Adjustment for Age and Health Status

The national average cost of health insurance (premium plus deductible and copayment amounts) is based on the age and health of the U.S. population. Differences between the AI/AN population and the U.S. population must be taken into account to develop a projected cost for the AI/AN population.

On the basis of age alone, the AI/AN population would be expected to have costs significantly below the U.S. average. The AI/AN population is much younger than the U.S. average, with far more children and far fewer individuals over age 65 (IHS 1997b). Based on average spending within age categories, the AI/AN population would be expected to have costs 22 percent below the U.S. average.

Once health status is factored in, however, the difference in expected costs should be much smaller. IHS statistics document high rates of mortality and morbidity within the AI/AN population (IHS 1997a, IHS 1997b). Numerous other studies have reached the same conclusion.¹

Regression-based risk adjustment is a method to translate statistics for individual diseases and medical conditions into a summary estimate of the expected cost of care. In this case, a pair of

¹ See John, (1993) for a lengthy list of abstracts of studies through 1993.

surveys fielded in 1987 by the National Center for Health Services Research (now the Agency for Health Care Policy Research) provide comprehensive health status data for risk adjustment of the AI/AN population. The 1987 *National Medical Expenditures Survey* (NMES) gathered detailed health status and spending data for a cross-section of the U.S. population. *The Survey of American Indians and Alaska Natives* (SAIAN), gathered identical information for approximately 6,000 AI/AN individuals. These surveys provide both an independent check on the health status of the AI/AN population and a ready data base from which to perform a standard risk adjustment analysis.

§5.4 provides details on the risk adjustment process. NMES data were used to determine the typical impact on cost for a variety of factors, including:

- Self-reported health status (excellent, good, fair, poor)
- Presence of specific diseases (e.g., diabetes)
- Disability (e.g., unable to work due to health problem).
- Childbirth
- Death in three subsequent years
- Age and sex factors

SAIAN provided data on the prevalence of these factors in the AI/AN Eligible population. The risk adjustment model multiplies the cost impact of each disease or condition by the prevalence of that condition within the population. (For example, it takes the average cost per diabetic individual and multiplies by the prevalence of diabetes.)

After risk adjustment, predicted costs for the AI/AN population are 7 percent below the U.S. average. As detailed in §5.4, this is due primarily to the higher incidence of diabetes and higher predicted maternity costs for this population. The difference between the age-sex adjustment alone (-22 percent) and the age-sex-health status adjustment (-7 percent) quantifies the poor average health of the AI/AN population. On an age-adjusted basis, the AI/AN population is about 20 percent sicker than the U.S. average.²

² Projected costs are 93% of the U.S. average, using age-sex-risk adjustment; and 78% of the U.S. average, using age-sex adjustment alone. The difference shows that the age-adjusted health status of the AI/AN population is 20 percent worse than the U.S. average ($0.93/0.78 = 1.2$).

Premium and copayments, U.S. population	\$3,391
Impact of age-sex-health risk adjustment	-7%
Premium and copayments, AI/AN population	\$3,153

§2.2.5 Adjustment for Geographic Location

A final adjustment to the premium data is necessary to account for the geographic differences between the AI/AN population and the U.S. population. Prices, including prices of health care services, tend to be lower in rural areas and higher in urban areas. Because the AI/AN population is largely rural, this would lead to lower predicted costs for this population. The geographic adjustment in this analysis uses Medicare institutional (hospital) and professional (physician) price data by county. The indices were adjusted to average 1.0 across the entire U.S. population. Restricting them to just the IHS service areas gives an average of 0.94. Thus, the net effect of the geographic adjustment is a 6 percent reduction in predicted costs, summarized as follows:

Premium and copayments, AI/AN population	\$3,153
Impact of geographic adjustment	-6%
Predicted cost AI/AN population, with geographic adj.	\$2,964

§2.2.6 Summary - Level of Need Funded Calculation

The Table below summarizes the chain of calculation, starting from average private premium per covered non-elderly individual, and ending with projected total cost (premium, deductibles, and copayments) for the Eligible cohort of the AI/AN population.

<i>Stage of Calculation</i>	<i>Cost per Person</i>
Premium per person, US under-65 population	\$2,100
Premium per person, US population	\$2,833
Cost (premium+copays+deductible), US population	\$3,391
Cost adjusted for AI/AN age, sex, health	\$3,153
Cost adjusted for AI/AN age, sex, health, location	\$2,964

Total costs for the four cohorts can be calculated from the cost per person and the number of individuals in the cohort. The calculation for the Eligible population above was extrapolated to the other cohorts by means of a simple age-sex adjustment. The projected total cost for the entire U.S. AI/AN population is \$7.3 billion dollars.

The Table below must be interpreted with caution. These estimated costs are only half of the LNF calculation. A significant portion of costs are paid by Medicaid, Medicare, and private insurers. These totals do not show total funding required, nor the funding required for the portion of care currently covered by the IHS.

**LEVEL OF NEED
PERSONAL HEALTH CARE SERVICES
1999 (Estimated)**

<i>AI/AN Populations</i>	<i>Population (1000s)</i>	<i>Cost per Person</i>	<i>Total Cost (\$Billions)</i>
User	1,342	\$2,980	\$4.00
Service Area	1,468	\$2,964	\$4.36
Urban Indian	332	\$2,971	\$0.99
All Other	635	\$3,121	\$1.98
Total All AI/AN population	2,435		\$7.32

§2.3 Sources and Uses of Funds for AI/AN Health Care

In this section, current health care funding for the AI/AN population is examined. In some cases, payers outside the IHS pay for health care benefits, reducing the need for current federal funding. In other cases, IHS funds pay for services outside of that benefit package, increasing the need for federal funding. Both situations must be included in the calculation of LNF for personal health care services.

Analysis in this section focuses on User and Eligible populations only, for two reasons. First, this section looks at payers other than the IHS. For the User and Eligible populations, SAIAN survey data provides systematic information. For the Urban and All Other populations, no systematic data are available. Second, this section looks at the IHS budget itself. The IHS budget is spent serving the User, Eligible, and (to a lesser extent) Urban cohorts. To a close approximation, the Level of Need Funded for the All Other cohort is zero.

§2.3.1 AI/AN Insurance Coverage Outside the IHS

Many AI/AN individuals have sources of health care coverage outside the IHS. The amount of care paid by these insurers must be taken into account when calculating the current LNF. Presently, there appears to be only one comprehensive estimate of the amount of care funded by other payers. An unpublished NCHSR estimate from the 1987 SAIAN, estimated that about 30 percent of health care spending for the Eligible population was paid for by payers other than the IHS (Cunningham, undated).

Several independent parts of SAIAN provide roughly similar estimates of care provided outside of the IHS. Approximately one-third of respondents say that their principal source of care is not the IHS. Payment records for individual services vary, but all suggest that no more than one-third of services provided, was in settings other than IHS.

<i>Type of Service</i>	<i>Percent (%) performed outside of IHS/IHS Contract Facilities and Providers</i>
Hospitalizations	20%
Physician visits	34%
Hospital OPD visits	12%
Emergency Room visits	28%

Source: SAIAN 1987 codebook

The 30 percent figure must be adjusted for the overall lower level of spending for the AI/AN population. Spending was and is, below the estimated level of need. Thus, 30 percent of spending would be less than 30 percent of estimated need. Preliminary spending totals from SAIAN indicate that payments by other insurers amounted to about 25 percent of estimated need.

§2.3.2 IHS Spending for Services Other than Personal Health Care

The second category of funds that must be tracked is IHS spending for care that is not personal health care services. Technically, IHS staff has estimated the general overlap between the FEP standard option benefit package and IHS spending. Staff has estimated that 17 percent of IHS appropriations support services that are not included in the FEP benefits package. This estimate includes a pro-rating of certain items such as maintenance, depreciation, and other “overhead” costs that are not direct patient care costs but which support the delivery of patient care.

§2.4 Complete LNF Calculation

The analyses above can be combined to present the complete LNF calculation for User and Eligible populations. For purposes of this calculation, the LNF for personal health care services is the ratio of Federal funds available for personal health care services, to the Federal funds needed to provide those services:

$$LNF = \frac{\text{Federal Funds Available for Personal Health Care Services (A)}}{\text{Federal Funds Needed for Personal Health Care Services (B)}}$$

The LNF numerator (A) is the Federal funding available to provide personal health care services to the AI/AN population. LNF numerator (A) is the IHS budget, less *spending* for items other than personal health care. The LNF denominator (B) is the Federal funding needed for personal health care services. It consists of the level of need estimated in §2 above, *less* the value of health care funded by other payers such as Medicare, Medicaid and private insurance.

The series of calculations set forth below are presented in the following Table:

1. Line 1 of the calculation is the level of need. This comes from the work performed in §2. It is the predicted cost of providing the mainstream health care benefits package, after adjusting for age, sex, health status and geographic location for the AI/AN population.
2. Line 2 of the calculation captures the value of care already being provided by other payers. This is the SAIAN-based estimate presented in §2.3.2 , that about 25 percent of the projected need for care is covered by other insurers.
3. Line 3 is the difference between lines 1 and 2. It shows estimated federal funding needed to provide the AI/AN population with health care services equivalent to the insurance coverage provided to Federal employees. This figure is the denominator for the LNF calculation.
4. Line 4 divides the IHS 1999 appropriation into a *per capita* amount, either per User or per Eligible (AI/AN person living in the IHS service area).
5. Line 5 shows the proportion of the IHS budget for items not related to personal health care services. IHS staff estimated this to be about 17 percent of the current IHS appropriation.
6. Line 6 is the difference between line 4 and line 5. This identifies that part of IHS' appropriations used for services covered in the FEP standard option benefit package. This is the numerator of the LNF calculation.
7. Line 7 shows the LNF for personal health care services, dividing line 6 by line 3. For the User population, it is 59 percent. For the Eligible population, it is 54 percent. LNF is lower for the Eligible population because budget dollars are spread among a larger number of individuals.

***LEVEL OF NEED
PERSONAL HEALTH CARE SERVICES
1999 (Estimated)***

	<u><i>Per User</i></u>	<u><i>Per Eligible</i></u>
1. Predicted total cost for mainstream benefit package	\$2,980	\$2,967
2. Less cost of services provided by other payers	-25%	-25%
3. Equals federal funding needed for AI/AN population	\$2,235	\$2,205
4. 1999 I.H.S. appropriation (per person)	\$1,578	\$1,443
5. Less costs of wraparound/public health services	-17%	-17%
6. Equals I.H.S. appropriation for personal health care.	\$1,310	\$1,198
7. Level of Need Funded (Line 6/Line 3)	59%	54%

§3. ISSUES FOR ESTIMATING LNF FOR 12 IHS AREAS

The LNF calculation is intended as a guide, both in aggregate and across areas. It is beyond the scope of this report to calculate LNF estimates for IHS Areas and service units, with the same level of accuracy as the national estimate performed above. Instead, this section outlines the data and analysis that will be needed to apply this LNF calculation to smaller geographic units.

§3.1 User vs. Eligible - Population Counts

The IHS User and Eligible population counts are derived from separate sources of data. The User count is based on IHS patient registry data and should reflect an unduplicated count of all eligible individuals who used any IHS service over the last three years. The count of Eligible population by contrast, is based on race as self-reported on 1990 Census data, and updated by IHS staff using annual vital statistics data.

While it is not surprising that these two sources of information do not match perfectly, the discrepancies are surprisingly large. Conceptually, Users should be a subset of Eligibles. In practice, Users exceed Eligibles for five of the 12 IHS regions, and, within Areas, for about 40 percent of the IHS service units.

While the choice between User and Eligible populations makes relatively little difference to the national estimate, it does make a substantial difference in area level estimates. In the California and Portland areas, for example, Users are about half of Eligibles; while in the Aberdeen and Billings areas, Users exceed Eligibles by about 20 percent.

The choice between User and Eligible cohorts involves both technical and policy considerations. On the one hand, the User count most clearly tracks the current IHS budget. It reflects actual care provided within IHS. On the other hand, focusing solely on the User population makes an important policy distinction: it limits analysis only to those individuals who are able to access IHS services currently. This may disadvantage areas with the lowest funding levels.

3.2 Age-Sex-Risk Adjustment

The detailed SAIAN data for risk adjustment are not available below the national level. For the Area level populations, the only information available at this time is demographic and vital statistics (births and deaths) data.

Age, sex and vital statistics data do not provide a very sensitive risk adjustment method. The lack of detailed morbidity and other health data means that risk adjustment scores would vary relatively little across areas, and that estimated level of need for each Area would differ little from the national average.

As the risk adjustment analysis above demonstrated, any individual disease or condition contributes little to the overall risk adjustment. Instead, information about a broad spectrum of diseases is required to provide a significant level of adjustment.

One approach would be to use diagnoses reported on IHS encounter data. These data can be used to track the reported prevalence of disease within the User population. A simple extrapolation to the Eligible population would then allow the predicted costs to vary significantly across regions.

The downside of such an approach is that it may result in risk scores that reflect availability of care. If patients are unable to see the physician, or must go outside the IHS to obtain care, the resulting diagnosis information is never recovered for use by the IHS. This risks penalizing areas that are currently the most under-funded. This approach would have to be validated against other sources of data before being applied in general. For example, areas with high health risk scores should have above-average mortality rates, and areas with high prevalence of diabetes based on encounter data should show similarly high rates based on IHS diabetes registry data.

§3.3 Geographic Price Adjustment

Discussions of the LNF Committee suggest omitting geographic price adjustments when determining the level of need. With the exception of Alaska, the formal IHS wage structure does not vary substantially across the country. Thus, the LNF Committee believed that (with the possible exception of Alaska) no geographic adjustment was appropriate when discussing the distribution of funds across IHS Areas.

This decision might be revisited. Wages rates for some occupations may reflect local market conditions, with service units near urban areas requiring the highest wages to attract required staff. In this case, available pricing information from Medicare would provide reasonable adjustments, because the Medicare hospital and physician price indices largely reflect wage and cost-of-living differences across areas.

A different set of geographic adjustments could be constructed from information on typical premium costs in each area, or manufacturer's health insurance costs. This type of index would not only reflect local wage rates, but local medical practice patterns as well. Compared to an adjusted based on Medicare prices, this approach would result in much larger variation in projected levels of need across areas.

§3.4 Payments by Other Payers

Other than the information provided by SAIAN, no consistent data are available in a form that can be readily applied to this analysis. Private payers do not report data in any centralized form and do not track race. Medicaid plans track AI/AN race and report this information centrally to the Health Care Financing Administration (HCFA). While this information is potentially useful, Medicaid data would require significant adjustment (for services covered and other factors) before it could be used by this analysis. Finally, Medicare recently began reporting race AI/AN, but its coding reflects the 1981 conversion of Social Security race coding. Generally speaking, individuals obtaining social security numbers prior to 1981 (the majority of today's Medicare beneficiaries) were unable to record their race as AI/AN.

In theory, data on IHS collections might provide information about the extent to which care is covered by other payers. In practice, however, variations in collections and in reporting practices appear to prevent the use of these data for that purpose. Briefly, only direct IHS care results in central reporting of collections.. Tribes are not required (and do not) report such information centrally.

Medicaid is the payer providing most care outside the IHS. For example, about two-thirds of IHS collections come from state Medicaid plans. Hence, efforts in this area should focus first on an accurate estimate of Medicaid spending for the AI/AN population, and only secondarily on spending by Medicare and private payers.

§3.5 IHS Budget Data

IHS staff analyzed Area budget data to determine the degree of overlap with the FEHBP standard option benefit package. The analysis of the national budget can be easily repeated for the 12 IHS regions..

Below the IHS regions, certain additional adjustments may be required for specific service units. Costs of tertiary hospital care are recorded in the unit in which the hospital is located, not the unit of the patient's residence. This causes a divergence between the level of need calculation (based on individuals' residence) and the IHS funding calculation for these service units.

Other potential adjustments to the IHS spending data were examined but found to be unimportant. For example, some portion of IHS spending covers individuals not residing in an IHS service area; or individuals not of AI/AN descent (who are nevertheless entitled to care (through marriage, e.g.)). Investigation of these cases by IHS staff suggests that any adjustment for these individuals would amount to less than 1 percent of the IHS budget.

§3.6 Generic Issues for Small Area Analysis

Beyond the issues above, some generic issues apply in any small-area analysis of health care spending. In general, the smaller the area or population considered, the lower the reliability of any actuarial projection of need for care. Small area issues include the following:

- Population estimates are unstable for small populations. Natality, mortality, and statistics on prevalence of disease all become relatively unstable when estimated for small populations.
- Certain areas or facilities may reasonably be expected to have exceptional costs. For example, low-volume facilities may have higher overhead costs per person served, and costs in Alaska will probably exceed costs elsewhere.
- Health care spending is subject to small-area variations. Costs typically vary for reasons that cannot be explained, such as local variations in medical practice.

- Certain IHS patient-care costs are not tracked on a per-capita basis. For example, costs in referral hospitals are not brought back to the patient's service unit of residence. Service units with such facilities will show above-average costs.
- The level of services provided may vary. Some service units may not deliver the entire package of services that are included in the FEHBP standard option plan, while others may provide more. This variation may be difficult to capture based solely on budget data.

3.7 Summary of Issues.

The LNF calculation in this report is based on the costs and operations of typical health insurance. Such a plan would certainly have a defined criterion for enrollment (eligibility), and would almost certainly have list of individuals eligible for care in the plan. Data on service use, such as health care claims, would have to be submitted in a uniform format, subject to the plan's scrutiny. Plans would maintain contracts or fee schedules showing cost per service in all areas served. Individuals with multiple sources of coverage would be required to disclose this, and the plan would make formal coordination-of-benefits arrangements with other payers to ensure that no excess payments were made. Cost accounting systems would be, if not uniform, at least comparable across the plan's sites.

The current IHS system does not fully satisfy these requirements. In part, that may reflect the sovereign nation status of the Tribes. Certain parts of the system may not be subject to standardization or centralization. In part, this may reflect the IHS' historical mission to provide care by building and staffing health care facilities. Many of the tools of commercial health insurance can be ignored for the operation of that type of delivery system.

For these and other reasons, the lack of standardized and centralized information will make the LNF calculation for Areas much more difficult than the LNF calculation for the U.S. as a whole. Significant effort will be required to obtain comparable data across areas, to impute values where data are not available, and to validate the resulting estimates against other benchmarks of cost, level of service, and access to care.

§4. FINDINGS AND CONCLUSION

❖ Findings

Work on developing a better way to estimate the Level of Need Funded began with the idea that a national benchmark for mainstream health insurance coverage already existed in the FEP standard option benefit package, the largest plan in the FEHBP. If the AI/AN population received health care services comparable to the national average, the LNF Work Group reasoned

that American Indians and Alaska Natives would have better health. An approximate calculation from national health spending data shows that IHS spending per user is well below U.S. personal health care spending per capita. The more refined calculation provided in this report starts with the FEHBP standard option benefit package; adjusts for all significant determinants of spending; accounts for all sources and uses of funds; and arrives at much the same conclusion as the simpler calculation. Nationally, IHS funding is only 54 percent of the LNF needed to provide FEHBP benefit package to the eligible AI/AN population, including the cost of premiums, copayments and deductibles.

This is a remarkable Finding that requires no further elaboration.

❖ **Conclusion**

The Finding that IHS funding is 54 percent of the Level of Need Funded requires some interpretation and a few caveats. There are areas of uncertainty where further work should be done to refine the calculations made, at both the national and Area levels.

▪ **Areas of Refinement**

First, while the analysis began with the FEHBP benefit level and cost, it does not mean that IHS funding should be patterned after the FEHBP. Under FEHBP, the Federal government pays an average of 72 percent of premiums, with enrollees paying the remainder plus the costs of copayments and deductibles. By contrast, the analysis of IHS funding assumes that the Federal Trust Responsibility will provide care to the AI/AN population without charge, as may be required by Treaty, Statute, or judicial decision.

Second, the analysis only addressed the overall level of health care financing and not the actual operation of the delivery system. Although the analysis began with FEHBP costs, it is not intended to imply that the IHS should move to an FEHBP type of system to deliver care. Movement toward a standard health insurance model would require major changes in the ways that eligibility for care is defined and services are delivered.

Third, related to the issue of financing vs. operations, some of the population cohorts considered in the analysis do not currently receive care or much care, from the IHS. While there is a strong link between IHS funding to User and Eligible populations, the linkage between IHS and Urban Indian project care for AI/ANs within an MSA is more tenuous. There is no current linkage between IHS funding and the *All Other* population residing outside the IHS service area. This is the main reason why analysis of LNF was performed for the User and Eligible cohorts only. A credible claim to funding on behalf of these populations must be accompanied by a plan for actually delivering or funding their health care.

Fourth, the analysis assumed that amounts paid by other insurers would remain constant even if the overall depth of coverage by the IHS increased. For Federal entitlement programs (Medicare and Medicaid), this is probably a reasonable assumption; so long as the burden of premium payments (for Medicare) can be neglected. For private health coverage, by contrast, some degree of substitution might be expected if the IHS were to offer free and complete coverage to

working individuals who could avoid premiums and copayments by turning down their employer-sponsored coverage. If IHS *coverage* were increased substantially, some modest substitution of IHS for private coverage might be expected.

Fifth, as noted earlier, more information is needed if the LNF methodology is to be applied accurately to the twelve IHS Areas, or to individual service units within Areas. Detailed data for risk adjustment and information on payments by other payers, would add greatly to the usefulness of this method as a means of allocating funds across Areas.

Sixth, as with any statistical measure, corroborating evidence would help to strengthen the inference that funding is low. In particular, the Area LNFs essentially tracked to IHS per-capita spending in each Area. It would be useful to determine whether low levels of funding correlate well with other possible measures of stress within the health care system. Examples might include waiting times for visits; postponement for elective surgery; infant mortality and low birthweight infants; and potentially avoidable hospitalizations. Other measures that are routinely calculated as part of the Healthcare Employer Data and Information Set (HEDIS), such as patient satisfaction with care; use of preventive care; and various clinical indicators of quality of care, might also be examples. Current IHS data systems, particularly those tracking encounter data, would support at least some of these corroborating measurements.

Seventh, the calculations performed in this report only addressed personal health care services. Approximately 17 percent of the IHS budget pays for items other than personal health care, such as water and sewer infrastructure, health professions scholarships, public health activities, etc. The LNF calculated here does not address any potential shortfalls in funding for those items.

Finally, intrinsic to any actuarial calculation, data and assumptions introduce some degree of uncertainty. The highest levels of uncertainty occur in the following areas:

- **Areas of Uncertainty**

Benefit Package. As discussed in §5.6, reasonable benefit designs might cost 5 percent less to 3 percent more than the FEP standard option benefit used here. Variation is small because copayments and deductibles cannot be charged. Only if long-term care benefits are added would the cost of the benefit package change significantly.

Average private premium per person. Three independent calculations of typical private premium per covered life gave similar results. This suggests that the average private premium per person figure is not a source of significant uncertainty in the calculation. Sensitivity analysis (below) demonstrates that LNF remains low even when a lower premium benchmark is chosen.

Population Counts. Unlike a traditional insurance plan, there is no requirement to enroll before receiving IHS care, and there is no definitive enrollment file showing all covered individuals. Criteria for eligibility vary widely and can be determined by individual Tribes. Across Areas, the ratio of Users to Eligibles ranges from 0.5 to 1.2, so that Area LNFs vary widely depending on whether Users or Eligibles are the basis for the calculation. If population were counted as the

greater of the Eligible or User count in each service unit, the total count of AI/AN population for IHS care would increase by about 17 percent beyond the simple count of the Eligible population.

Risk adjustment. The risk adjustment analysis depends on 1987 survey data. The national estimate is subject to the uncertainty typical of this type of statistical analysis. The survey data do not support an accurate adjustment at the Area level, and additional data must be obtained before an accurate adjustment across areas can be made.

Geographic price adjustment. Medicare pricing data were used for this adjustment. Because Medicare pays for roughly one-third of all acute health care, these factors reflect the transaction prices for a significant portion of the market. The overall geographic adjustment used here (-6 percent) reflected the average for the IHS service area counties. Based on the population weighting used, that adjustment could have been as large as -12 percent (see §5.5). The geographic adjustment did not make any provision for exceptional costs of care in remote rural areas, and the geographic adjustment was not applied to the analysis of LNF by Area.

IHS spending for services outside the FEP standard option package. IHS staff performed this portion of the analysis. To a large degree, individual line items could be wholly included or excluded. In other cases, budget line items were pro-rated based on expert judgment. This leaves a small degree of uncertainty regarding the accuracy of allocation for these items.

Spending by other payers. This is the weakest part of the analysis. Nationally, a single estimate from SAIAN is available. On an Area basis, no information is uniformly available. Collections from third-party insurers vary widely across Areas and appear to be more closely related to administrative capacity and collection efforts than to actual amounts of care funded by other insurers.

▪ Sensitivity Analysis

In conclusion, the areas of refinement, uncertainty, and *caveat* do not undermine the main Finding regarding the LNF calculation at the national level. A sensitivity analysis demonstrates that plausible modifications to many of the assumptions would still lead to an LNF well below 100 percent.

Choose a lower premium benchmark. The analysis above was based on an average premium in FEHBP, which was close to the average premium for all private insurance plans. This was in keeping with identifying the cost of mainstream health insurance coverage. Alternatively, some lower but plausible benchmark might be chosen. In this case, the LNF calculation was repeated using the 25th percentile of FEHBP premiums rather than the average FEHBP premium. This premium reflects a plan that is cheaper than three-quarters of the 271 FEHBP plans that are open to all federal employees. The total premium for the 25th percentile plan was 22 percent below the average. *As a result, the LNF for the eligible population would be 66 percent, starting from that 25th percentile premium.*

Choose a broader population definition. A larger count of AI/AN population leads to a lower estimated LNF, because the IHS budget is spread among a larger number of individuals. Taking

the larger of the census-based definition (eligibles) and the IHS count of users in each area gives a larger total population. An LNF based on this broader population definition would be 46 percent.

Double the impact of age-sex-risk adjustment. Regression analysis resulted in a 7 percent reduction in projected costs for the AI/AN population. Even if that estimate were arbitrarily doubled there would still be an LNF of 58 percent.

Double the adjustment for rural location. Similarly, even if the cost reduction attributable to rural location were arbitrarily doubled, there would only be a modest impact on LNF. Doubling from 6 percent to 12 percent would lead to an LNF of 57 percent.

Increase estimated payments by other insurers. Finally, the least reliable estimate in the LNF calculation is the proportion of costs that are paid by others. Even if the proportion of costs were increased from 25 percent to 35 percent, there would still be a high LNF of 62 percent.

SENSITIVITY ANALYSIS FOR ELIGIBLE POPULATION

<u>Assumptions</u>	<u>Estimated LNF</u>
<i>Current set of assumptions</i>	54%
Population counted as Eligibles based on Census	
Age, sex, risk adjustment factor of -7 percent	
Geographic factor of -6 percent	
Private payers cover 25 percent of current spending	
<i>Alternative Assumptions:</i>	
Choose 25 th percentile of FEHBP premiums, not average	66%
Population counted as greater of Eligible or User	46%
Age, sex, risk adjustment factor of -14 percent	58%
Geographic factor of -12 percent	57%
Private payers cover 35 percent of current spending	62%

§5. DETAIL ON DATA AND METHODS

This section of the report provides lengthier discussion of technical issues and data used for the LNF calculation. Separate sections address the population cohorts, the calculation of average private premium per covered life, actuarial value of deductible and copayments under FEP standard option, risk adjustment, and geographic price adjustment, and variation in the benefit package.

§5.1 Population Cohorts

As part of this project, the LNF Committee identified four population cohorts requiring separate LNF estimates: User, Eligible, Urban Indian, and All Other. This section briefly describes those four populations.

§5.1.1 Definition and Description of Populations

Users of IHS-funded care. This population consists of all individuals who have had some contact with IHS-sponsored health care during the last three years. Data on the number of such individuals is an unduplicated count of users based on the IHS patient registry system. Individuals counted in this group actually received IHS-funded care over a three-year period. The most recently available data for this population was 1997 (three year period ending in 1997).

For purposes of analysis, the 1997 user population count was inflated to 1999 using estimated growth in the service area population (below). Counts of users for this analysis were supplied by IHS statistical staff in the form of a spreadsheet by age and sex within IHS service units.

Eligibles: AI/AN residents of IHS service areas. This population consists of all American Indian/Alaska Native (AI/AN) individuals residing within IHS service areas, that is, on or near Indian reservation lands. Typically, these service areas consist of counties or groups of counties, but in a few instances individual counties are split across service units or are split between service and non-service areas. In those cases, county-level data are prorated between the eligible and all other cohort using data supplied by IHS statistical staff.

This count of individuals is derived from 1990 Census data. IHS staff project these data forward using vital statistics (births and deaths) data as reported by the National Center for Health Statistics. Because the ultimate source of this information is Census data, counts of individuals in this file reflect self-reported race designation on the 1990 Census. These data were supplied by IHS as a set of 1990 county files showing population by age and sex, along with annual files showing estimated total population in each county for the years 1990 to 2000.

Urban Indian. The Urban Indian population is defined as all AI/AN individuals living in metropolitan statistical areas (MSAs) that are served by one of 34 urban health programs funded through the IHS. Counts for this population are based on Census data, and so rely on self-reported race designation from the 1990 Census. To identify this population, the IHS provided a paper-copy listing of IHS Urban Indian projects, along with the associated counties in the relevant MSAs.

Two important technical factors need to be noted for this population. First, there is significant overlap between the I.H.S service areas (service units) and the MSAs in which the IHS funds urban health projects. Roughly one-third of the AI/AN population living in these MSAs resides in IHS service units (IHS 1997b). Throughout this LNF analysis, population counts for the Urban Indian cohort include only those individuals who are not already counted in the Eligible (service area) population. A second technical factor is that there is no count of IHS Users to match the Urban Indian cohort. Users of the Urban Indian projects are, by and large, counted in their Service Unit of residence.

All Other AI/AN population. The final cohort consists of all AI/AN individuals not residing in IHS service areas or in MSAs served by Urban Indian projects. Counts of these individuals are derived from Census data, and reflect self-reported race on the 1990 census, updated with births and deaths data. A separate analysis by IHS staff verified that few of these individuals are users of IHS services.

ESTIMATED SIZE OF FOUR POPULATION COHORTS

<u>Cohort</u>	<u>Estimated 1999 population, 1000s.</u>
Users	1,342*
Eligible (Residing in Service Area)	1,468
Urban Indian not in Service Area	332
All Other	635
 Total	 2,435

* Roughly 11,000 additional users were identified after production of the spreadsheet delivered to CHPS. The estimates in this report do not reflect those additional 11,000 users.

§5.1.2 Overlap, Uncertainty, and Data Availability

From the standpoint of the LNF estimates, information on the size of the cohorts needs to be supplemented with an understanding of overlap among populations, uncertainty in the population estimates, and availability of data for each population. This section summarizes findings in these areas.

Overlap of populations. In the prior section, the three Census-based populations were set up to be non-overlapping counts of individuals. As defined above, there are unique counts for Eligible, Urban Indian outside of IHS service area, and all other AI/AN population cohorts.

A more difficult question is the overlap between the user population and the three Census-based population counts. The User population is based on the IHS patient registry and reflects all eligible individuals who received IHS funded health care at any time in a three-year period. The other population counts are based on U.S. Census data, based on self-reported race. That immediately raised three significant technical questions.

First, is the User population a subset of the eligible population in the service area? In a typical health insurance plan, individuals must enroll in the plan and users are a proper subset of enrollees. This is an important point for estimation of LNF starting from premium data, because insurance premiums average the cost of the entire enrolled population (users and non-users). Average cost per user of care would be expected to be significantly higher than average cost per enrollee (premium).

For two reasons, no additional costs were imputed for the User population in this analysis. First, the three-year window used by the IHS to count individuals should include a very large fraction of all eligible individuals. From NMES survey data, roughly 71 percent of the entire population

uses care at least once during the year. Counts from IHS suggest that about 75 percent of their total User population used care during the last year. The small difference between NMES (entire population) and IHS (user population) suggests that the IHS user count should within a few percent of the total count of eligible individuals. Second, there are substantial differences between User and Eligible populations for individual service units. The user population exceeds the service area population for about two-fifths of service units, primarily those in remote areas, while in heavily urbanized areas the user population is a low percentage of the Eligible population.

***NON-OVERLAP OF USER AND SERVICE-AREA POPULATION
SERVICE UNITS SORTED BY USERS PER SERVICE AREA POPULATION***

Quintile	Users Per Svc Area Pop	AI/AN as Percent of Total Area Population	Persons Per Square Mile
1 Lowest	0.38	0.9%	110
2	0.77	2.3	30
3	1.00	5.2	18
4	1.11	6.7	5
5 Highest	1.28	13.4	9

One potential explanation for areas with low users per eligible is the potential for random miscoding of race on Census data. The ratio of users per eligible is smallest in areas where AI/AN population is the lowest fraction of the total. If even a small portion of the non-AI/AN population accidentally reported themselves as AI/AN, this would significantly boost the Census count relative to the true AI/AN population.

One potential method to address the non-overlap of the User and Eligible populations would be to take the greater of the two populations within each area. This would divide divides the AI/AN population into those served (users) plus unserved eligible population (service area residents in excess of the user population, if any). Applying this rule to the individual service units would increase the total count of AI/AN eligible/user population by roughly 17 percent.

A final area of potential overlap is the inclusion of some out-of-service-area population within the user population counts. A separate data run by IHS identified less than 1.5 percent of the user population as living outside the IHS service areas. Because these individuals are likely to be sporadic users of care (and so have IHS-covered spending well below average), this population appears small enough to be neglected for any further analysis.

Uncertainty of population estimates. The lack of overlap of the user and service area counts highlights the population counts as source of some uncertainty in the LNF calculation. Uncertainty in the count of individuals translates directly into uncertainty in the estimate of total funds needed for health care.

This LNF calculation uses private health insurance as the model for estimating funds needed for health care. In effect, we estimate the premium that would be required to cover the AI/AN

population in a mainstream plan. The total funding needed from all sources (IHS and other insurers) is simply this premium times the number of individuals to be covered.

A third potential source of AI/AN population information comes from the U.S. Bureau of Indian Affairs, which routinely tracks information such as total labor force and unemployment rates for federally-recognized tribes. In aggregate, the BIA counts match the IHS counts reasonably well, with a 1995 service area population estimate of 1.256 million (BIA) versus roughly 1.356 million estimated by the IHS, a difference of less than 7 percent.

Taken together, the lack of a definite criterion for "enrollment" in IHS care, the lack of agreement between the user and service area populations, and the modest disagreement between IHS service area counts and B.I.A. service area counts all add a cautionary note to the LNF analysis. For the entire U.S., the level of uncertainty appears to be bounded by the difference between the IHS and B.I.A. population estimates. For smaller areas, however, the difference between the user and service area counts can be large, and this in turn would affect any LNF calculation applied at those smaller geographic areas.

Data availability for each cohort. A final necessary part of the description of the cohorts is the available of data describing each cohort. Estimating the complete LNF model requires information health risk factors, spending by other payers, and spending by the IHS

The only information known for each cohort is the estimated age-sex distribution of the population. Beyond that, any individual piece of data will be available for some but not all of the populations. Birth and death rates are known for all of the Census-defined populations. Health status information for the service area population is known nationally from the 1987 Survey of American Indians and Alaska Natives (SAIAN), which provides very detailed information health status, risk factors, and chronic conditions for a sample of more than 6,000 individuals. In principle, IHS data reporting systems might be used to identify prevalence of disease based on reported diagnoses on encounter forms or through IHS systems aimed at special populations such as diabetics.

Health care spending by other payers is the area with the least available information. SAIAN provides estimated spending for the service area population, but only for the nation as a whole. Medicaid data systems can supply tabulations of spending by race AI/AN, but these are only readily available at the state level. (This means that all three Census-based populations (service area, urban Indian, other) are commingled in available Medicaid spending statistics.) The same is probably true for Medicare, although coding of AI/AN race on Medicare data does not appear complete. Private payer data are probably unavailable except as estimated from SAIAN for the service area population nationally.

The availability of data for these populations is summarized below. Some data are available at the lowest geographic level (C for county or service unit), others by state (S), others are only available based on a national (N) estimate.

POTENTIAL AVAILABILITY OF DATA BY POPULATION COHORT
(C = COUNTY/SVC AREA, S = STATE, N = NATION)

Users	Svc.	Urban	All	Total
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		Area	Indian		
Population by age and sex	C	C	C	C	C
Births	C	C	C	C	C
Deaths	C	C	C	C	C
Health risk factors (SAIAN)	-	N	-	-	-
Health risk factors (encounter)	C	-	-	-	-
IHS collections from payers	C	-	-	-	-
Medicaid spending	-	N	-	-	S
Medicare spending	-	N	-	-	S(?)
Private insurance spending	-	N	-	-	-

§5.1.3 Summary of Population Cohorts

The IHS has supplied all of the basic population data need for the estimation of the level of need funded model. Census data, updated with information on births and deaths, provides projected counts of AI/AN population for each county. Counties are then split or aggregated to match the IHS service units. A listing of Urban Indian projects identifies the Census AI/AN population living in MSAs where Indian urban health projects are located. IHS also supplied a separate set of counts of the user population by service unit, based on unique users accessing IHS-sponsored health care between 1995 and 1997.

In aggregate, these population counts appear consistent with one another, and with a separate population estimate determined by the B.I.A. At a lower geographic level, however, there are large differences between the service area population and user population, with the user population exceeding the service area population in about 40 percent of service units. These four cohorts also differ in terms of the data available. Age and sex data are available for all. Our most detailed source of health and spending data, SAIAN, is available only for the service area population, and only at a national level. Estimating the critical data elements of the LNF model, including health status and spending by other payers, will involve extrapolations and approximations to fill in the missing information.

§5.2 Baseline Premium Per Insured Person – U.S. Population

The original intention for this actuarial analysis was to use the Blue Cross Blue Shield Federal Employee Program (BCBS FEP) standard option plan as the benchmark for all cost calculations. More than 40 percent of FEHBP enrollment is in BCBS plans, with standard option being the largest by far of any plan within the FEHBP. Nearly all plan premiums cluster around the standard option premium, and benefits tend to align with the benefits offered by FEP (PPRC 1997). Moreover, FEHBP premiums are just slightly below the national average of all private premiums (FEHBP 1997). Thus, a study of FEP standard option would have provide a concrete plan whose costs reflected FEHBP as a whole and whose costs were close to average of plans nationwide.

Unfortunately, neither the Office of Personnel Management (OPM) nor the FEP would provide detailed data to aid this study. Accordingly, this study uses the benefits structure of the FEP

standard option plan as the basis for the analysis, and looks at other publicly-available sources of information to estimate the average premium per covered life for mainstream health insurance plans of this type.

In each case, the premium calculated is the premium for the under-65 population. The elderly are covered primarily by Medicare, and private insurance typically covers only costs that are not covered by Medicare. For FEHPB, the average cost per elderly FEHBP enrollee is very close to (or slightly below) the average cost for the under-65 population (OPM 1999). (For FEHBP, then, the average cost is the same whether the elderly are included or excluded from the calculation.) For the other calculations, the analysis is explicitly restricted to the under-65 population.

§5.2.1 Average Total Premium Per Covered Life in FEHBP

Information from the Federal Workforce Fact Book 1998 provides sufficient data to calculate the average premium per covered life for FEHBP as a whole for 1997 (OPM 1998). Inflating that for subsequent premium increases gives an estimated 1999 premium. Dividing by number of enrollees (lives covered) per subscriber yields average premium cost per covered life.

WEIGHTED AVERAGE PREMIUM PER COVERED LIFE IN FEHBP

A:1997 weighted average premium (OPM 1998)	\$3,756
B:Times 1998 premium increase (OPM 1997)	x 1.085
C:Times 1999 projected premium increase (OPM 1998b).	x 1.102
D:Equals estimated weighted premium 1999 (AxBxC)	\$4,490
E:Total enrollees	8,692
F:Total subscribers	4,133
G:Enrollees per subscriber (E/F)	2.10
H:1999 premium per enrollee (D/G)	\$2,138.

Source: Federal Workforce Fact Book 1998 (OPM 1998). Premium inflation data from OPM premium announcements (OPM 1997, OPM 1998a).

§5.2.2 Average Private Benefits Cost per Covered Person

An alternative calculation can start with 1996 National Health Spending Accounts data. Total private health insurance benefits payments are increased by the amount of insurance overhead to get total premium payments. These are adjusted to remove the impact of Medigap plans, and counts of covered individuals are similarly adjusted to remove the elderly covered by private plans. The resulting private premium per under-65 individual is inflated from 1996 to 1999 based on average private premium growth over that period.

AVERAGE PRIVATE PREMIUM COST FROM NATIONAL HEALTH ACCOUNTS DATA

A: Private health insurance payments to providers	\$337.3
B: Private health insurance overhead costs	45
C: Approximate private health insurance premiums (A+B)	382.3B
D: Number of Medicare Beneficiaries	37M
E: Average total spending per Medicare beneficiary	\$9,600
F: Fraction of spending covered by private ins.	0.09
G: Average Medigap premium loading	1.2
H: Private ins. Dollars on behalf of elderly (DxExFxG)	\$38.38B
I: Private insurance payments for under-65 (C-H)	343.6
J: Number of privately insured	185.9M
K: Less over age 65 with any private coverage	21.8M
L: Under-65 with private insurance (J-K)	164.1M
M: 1996 Private ins premiums per under-65 insured (I/L)	\$2,093
N: Premium inflation, 1996 to 1999	1.107
O: 1999 private ins premium per under-65 insured (MxN)	\$2,318

Source: National Health Spending Accounts data from Levit et al.1997, Medicare average cost and private coverage from HCFA 1998.

§5.2.3 Reported Average Private Premium

Finally, OPM premium announcements prior to 1999 typically included information on average private premiums. Inflating the most recently announced figure for premium inflation through 1999, then dividing by typical number of enrollees per contract gives yet a third estimated average private premium per covered life.

AVERAGE PRIVATE PREMIUM BASED ON OPM DOCUMENTS

A: 1996 average private premium (OPM 1997)	\$3,925
B: Premium inflation through 1999	1.107
C: Estimated 1999 average private premium	\$4,345
D: Average persons per insured	2.1
F: Average premium per insured person	\$2,069

§5.3 Actuarial Analysis for Out-of-Pocket Payments

Premiums constitute only part of total spending under a particular health insurance policy. Plans typically include deductible and copayment liabilities. For indemnity plans, a rule of thumb is that deductible and copayment liabilities account for 20 percent of total spending under the plan. For the Blue Cross Blue Shield Federal Employee Plan (BCBS FEP) standard option benefit, the analysis below estimates total out-of-pocket liabilities at 16 percent of total costs, in keeping with the lower out-of-pocket costs for use of in-network providers.

The following approach was used to estimate out-of-pocket liabilities under the FEP standard option benefit. First, National Medical Expenditures Survey spending data were inflated to match 1999 spending totals. All privately insured individuals in the NMES sample were taken as the baseline population for the actuarial analysis. Each component of spending tracked in NMES was matched to the corresponding element of the FEP standard option benefit package. (Nursing home care data are not on the NMES file and are not covered by FEP, hence are excluded entirely from the analysis.)

Second, detailed computer code was written to apply the FEB payment rules to the detailed person-level and family-level annual spending data from NMES. This code modeled the separate deductible and copayment requirements for each type of service. Because the FEP deductible rules often apply to an entire family, the family linkages of the NMES data were used to calculate total out-of-pocket spending using rules applying to individuals and to the family as a whole. These family-level sums were then brought back to per-capita spending by dividing by the average number of individuals per family.

Third, a significant assumption regarding out-of-network care was required to calculate out-of-pocket liabilities. FEP, like most such plans, has different rules for in-network and out-of-network care. The analysis assumed that 30 percent of care was provided out-of-network, similar to the assumptions of a recent CBO-sponsored study (CBO 1997). For this analysis, a random 30 percent of families were assumed to obtain all their care out-of-network. That assumption was made for convenience but had only a modest impact on estimated out-of-pocket costs (see below).

Under the assumption of 30 percent out-of-network spending, total out-of-pocket costs for covered services averaged \$414 per person. This is roughly 16 percent of total spending for covered services, lower than the 20 percent typically assumed for indemnity insurance. A separate analysis was performed assuming that no care was provided out-of-network. In that case, out-of-pocket cost per person would total \$336, or about 14 percent of total spending.

Finally, the copayments exclude an estimated \$176 per person (under age 65) for non-covered items, mainly orthodontia, glasses, bandages and supplies. Nursing home (domicillary home) costs are not included in this model, nor are balance billing amounts, charges in excess of the amounts that the insurer approves for payment.

§5.4 Risk Adjustment

This section presents the adjustments for the age, sex, and health status of the AI/AN population relative to the U.S. average. Analysis uses a health status and other data from a pair of surveys, NMES for the U.S. population and SAIAN for the AI/AN population.

§5.4.1 Age-sex adjustment alone

IHS statistics demonstrate that the AI/AN population is, on average, much younger than the U.S. population as a whole. A higher proportion of the AI/AN population is under age 15, while a much lower proportion is over age 65. The median age of the AI/AN population is about 24 years, versus a median age of 33 for the U.S. population (IHS 1997a).

YOUNG AND OLD IN THE U.S. AND AI/AN POPULATIONS		
	Percent of U.S. Population	Percent of AI/AN population
Under age 15	22%	33%
Over age 65	13	6%

Source: U.S. Indian Health Service (IHS 1997a)

This age distribution is the result of both higher death rates and higher birth rates for the AI/AN population relative to the U.S. average. The age-adjusted mortality rate for the AI/AN population exceeds the U.S. average by about 35 percent (IHS 1997b). In 1993, life expectancy at birth was 71.1 years, versus 75.5 for the U.S. population (IHS 1997b). The (unadjusted) birth rate for the AI/AN population exceeds the U.S. average by about 65 percent, though attributing births of mixed-race couples to the count of AI/AN births may somewhat inflate this figure (IHS 1997b)

All other things equal, the lower average age of the AI/AN population suggests that their health care needs should be lower than the U.S. average. Age-sex adjustment provides a numerical estimate of the impact of age on predicted costs, by asking the following question: How would AI/AN costs compare to the U.S. average, if each AI/AN's individual cost equaled the U.S. average for individuals of the same age and sex?

In practice, answering the question proceeds in four steps. First, divide the U.S. population and the AI/AN population into age-sex cells, for example, males age 0 to 10, males age 11 to 20 ... females over age 85. Next, use National Medical Expenditures Survey (NMES) data to calculate U.S. average spending per capita in each age-sex cell. Third, determine what AI/AN spending would have been if each individual had spent the U.S. average within each cell. Finally, compare that predicted spending per capita for the AI/AN population to predicted spending per capita for the U.S. population.

Age-sex adjusted predicted cost for the AI/AN population is 22 percent below the national average. This is a direct result of the high proportion of children and low proportion of elderly in the AI/AN population.

This standard actuarial approach is probably not appropriate in this case. Age-sex adjustment is designed to capture the effects when one population selects between two health care plans. There, differences in age-sex mix in two health plans are the result of one-point-in-time choice of health plan. Lower age should be associated with lower costs. For example, the plan attracting younger beneficiaries would be expected to have a lower overall mortality rate. Standard age-sex adjustment would indeed impute a lower mortality rate to the younger population.

For this comparison, by contrast, the age-sex mix of the population is not the result of a one-time choice, but instead reflects ongoing birth and death processes. The AI/AN population is younger, in part, because the mortality rate is higher (not lower). In this case, standard age-sex adjustment provides a potentially misleading picture of the expected difference in costs.

The second and more important flaw in age-sex adjustment is that it does not address the poorer health status of the AI/AN population. Statistics from the Census, from the National Center for Health Statistics, from the IHS, and from independent research studies have confirmed higher incidence of certain costly health events and conditions in the AI/AN population. In addition to birth and death, the AI/AN population has higher incidence of diabetes, alcoholism, injury and poisoning, and certain other conditions. These factors must be included in an accurate projection of costs.

§5.4.2 Health Status Risk Adjustment

Health status risk adjustment is a much more comprehensive way to adjust for differences between the AI/AN population and the U.S. population as a whole. This approach combines all the health factors relevant to predicting costs (birth, age, sex, disease, death) in a single measure that weights each factor in proportion to its contribution to health care costs. This approach is used here is a standard one, and has been used, for example, project expected costs for Medicare beneficiaries enrolling in health maintenance organizations (HMOs) (Riley et al. 1996).

In this study, matched surveys were used to create an age-sex-risk index for the AI/AN population. First, the NMES data provide health care spending information for a cross-section of U.S. households, with information on birth, death, disease, and health status. A regression analysis was used to predict spending based on age, sex, birth, death, disease, and health status.

The results of that regression effectively give the "price" of each component -- the contribution of that component in accounting for total health care spending.

The second source of data is the Survey of American Indians and Alaska Natives (SAIAN). SAIAN was undertaken at the same time as NMES, and provides comparable health status information for the AI/AN population. The SAIAN data provide information on the incidence of each factor within the AI/AN population. Incidence (measured from SAIAN) times price per event (estimated from NMES) gives predicted health care costs for the AI/AN population.

Results are given in the table below. The table shows the regression coefficient (the dollar impact of each disease), incidence in the U.S. and AI/AN populations, impact on projected costs for the AI/AN population relative to the U.S. population. (For reference, the table also shows the relative prevalence of disease with and with age adjustment.) For example, arthritis was estimated to increase costs by \$347. Because it is more prevalent in the U.S. population than in the AI/AN population (16 per 100 U.S. versus 10 per 100 SAIAN), the net impact of arthritis is to increase the gap between predicted U.S. costs and predicted SAIAN costs by \$21.

Variables included in the regression reflect essentially the entire spectrum of health status indicators available from NMES and SAIAN, with two significant exceptions. Both surveys report information on obesity and smoking. When these variables were included in the regression, however, they consistently performed in a perverse fashion, with obesity and smoking resulting in lower predicted costs, and these variables were accordingly omitted from the analysis. Second, NMES and SAIAN did not collect information on alcohol consumption. Thus, impact of higher rates of alcoholism among the AI/AN population is not captured directly in this regression. Instead, only the indirect effects (via mortality rate and disability, for example) are reflected in this analysis.

The impact column clearly illustrates why this broad-brush regression analysis approach is needed to estimate the impact of health status on costs. No single disease contributes very much to the overall difference in costs between the AI/AN and U.S. populations. Only when the whole spectrum of morbidity is considered do any large population-based differences in predicted cost appear.

Data from the impact column (including age, sex, and intercept variables not shown) were used to calculate the overall predicted costs of the AI/AN population relative to the U.S. (NMES) average. Average projected spending in NMES was \$1,554 (1987 average). The sum of the impact column was -\$114. That is, all factors considered, the AI/AN population's costs would be expected to be \$114 below the U.S. average. Taking percentages, projected cost for the AI/AN population is 93 percent of the U.S. average.

The lack of adjustment for miscoding of race on death certificates does not have a significant impact on the projected costs of the AI/AN population. Miscoding of race on death certificates leads to a significant undercount of AI/AN deaths (Support Services International, 1996). The NMES/SAIAN comparison shows an age-adjusted AI/AN mortality rate of 1.08 times the U.S. average, while IHS calculations based on vital statistics data adjusted for miscoding of race show that the age-adjusted mortality rate exceeds the U.S. average by 35 percent. Recalculating the

impacts to reflect this higher mortality rate would raise AI/AN projected costs from 93 percent to 94 percent of the U.S. average.

Finally, this risk adjustment analysis demonstrates the relatively poor health (age-adjusted) of the AI/AN population. Based on age-sex distribution alone, the AI/AN population would be expected to have costs about 78 percent of the national average. Risk adjustment using age, sex, and health status factors results in projected costs 93 percent of the U.S. average. The 20 percent difference between these two figures (.93/.78) reflects the poor health and high maternity costs of this population. Based on this analysis, the AI/AN population is roughly 20 percent less healthy than the U.S. population on an age-adjusted basis. Excluding the impact of maternity (as not reflecting poor health per se), the AI/AN population health status would still 17 percent worse than the U.S. average, age-sex adjusted.

Risk Adjustment Regression Results From 1987 NMES and SAIAN

Variable	Regression Coefficient	P Value	P<= 0.05	Rate Per Capita NMES	Rate Per Capita SAIAN	Impact on AI/AN Cost	SAIAN/ NMES Rate, Not Adjusted	SAIAN/ NMES Rate, Age-sex Adjusted
<u>Variables applying to Adults</u>								
Ever had arthritis	\$347	0.00 *		0.16	0.10	-\$21	0.61	0.91
Ever had cancer	\$922	0.00 *		0.04	0.02	-\$20	0.41	0.60
Died during next three years	\$5,824	0.00 *		0.01	0.01	-\$20	0.76	1.08
Delivered child	\$3,198	0.00 *		0.02	0.02	\$28	1.56	1.49
Diabetes	\$1,027	0.00 *		0.04	0.06	\$19	1.46	2.20
Ever had emphysema	-\$144	0.49		0.02	0.01	\$2	0.44	0.67
Ever had gallbladder disease	\$292	0.04 *		0.04	0.04	-\$2	0.87	1.25
Ever had athrosclerosis	-\$213	0.26		0.03	0.01	\$4	0.38	0.63
Ever had a heart attack	\$384	0.06		0.03	0.02	-\$4	0.65	1.04
Ever had heart disease	\$2,129	0.00 *		0.05	0.03	-\$44	0.57	0.89
Ever had high blood pressure	\$173	0.04 *		0.18	0.12	-\$11	0.65	0.93
Skin trouble/allergy	-\$370	0.25		0.01	0.01	\$2	0.54	0.34
Ever had rheumatism	-\$741	0.00 *		0.04	0.02	\$12	0.56	0.90
Ever had stroke.	\$621	0.01 *		0.02	0.01	-\$3	0.71	1.10
Unable to work due to health	\$2,282	0.00 *		0.08	0.07	-\$2	0.99	1.39
Limit activity due to health	\$748	0.09		0.00	0.01	\$1	1.42	0.89
Self-reported health fair	\$568	0.00 *		0.14	0.17	\$15	1.19	1.46
Self-reported health good	\$149	0.02 *		0.48	0.47	-\$1	0.99	1.00
Self-reported health poor	\$3,115	0.00 *		0.03	0.03	-\$10	0.90	1.32
<u>Variables Applying to Children:</u>								
Anemia in last year	\$1,152	0.01 *		0.00	0.01	\$3	1.66	1.12
Asthma in last year	\$461	0.03 *		0.02	0.03	\$3	1.32	0.85
Diarrhea	\$175	0.39		0.02	0.03	\$1	1.27	0.83
Ear infection during last mo.	\$256	0.22		0.02	0.05	\$7	2.08	1.33
Can play like others last 3mo	-\$97	0.81		0.06	0.08	-\$2	1.38	0.87
Hay fever/allergies	\$44	0.75		0.05	0.05	\$0	0.90	0.59
Heart problems	\$1,439	0.00 *		0.01	0.01	\$4	1.43	0.92
Limit act due to hlth last 3mo	\$1,101	0.00 *		0.01	0.01	\$7	1.72	1.19
Health limits attend at school	-\$135	0.79		0.00	0.01	\$0	1.84	1.26
Migraine/headaches past yr	\$243	0.19		0.03	0.03	\$1	1.14	0.76
Skin infection past month	\$182	0.37		0.02	0.02	-\$1	0.82	0.54
Stomache ache last mo.	\$129	0.50		0.03	0.04	\$2	1.67	1.10
Stomache flu last mo.	-\$174	0.46		0.02	0.04	-\$5	2.49	1.64
Sort throat last month	-\$130	0.51		0.02	0.06	-\$5	2.65	1.75
Two or more ear infect yr.	\$177	0.37		0.03	0.06	\$5	2.07	1.30

NOTES:

Regression also included age-sex factors and intercept term

Average per capita cost equals \$1554 for purposes of this calculation (NMES 1987).

Cost calculation assumes all individuals are privately insured.

All calculations are weighted using NMES and SAIAN sample weights.

Adjusted R-squared for this regression is 14 percent.

§5.5 Adjustment for Geographic Location

Another way in which the AI/AN population may differ from the U.S. population is location. On average, the AI/AN population lives in more rural locations than the average for the entire U.S. Because health care prices tend to be lower in rural areas, that suggests that AI/AN health care costs would (all other things equal) be lower as well.

The proper extent of a geographic adjustment for this actuarial calculation is difficult to determine. Three potential factors might be included in an adjustment. First, the adjustment could be based solely on differences in price per service (fee levels). A second level of adjustment would factor in rural practice patterns, because physicians in rural areas tend to provide fewer and less complex services. Yet a third level of adjustment would include higher costs for the most remote areas of the country. Remote (as opposed to merely rural) areas impose higher costs in the form of transportation, potentially under-utilized emergency or standby facilities, and possibly higher wages required to retain medical personnel in remote settings.

This actuarial analysis takes a middle approach of accounting only for differences in price per service. Price data are publicly available in the form of Medicare payment indices, while information on practice patterns and on exception delivery costs in remote areas is much more sketchy. This approach provides some degree of adjustment, but will not, for example, capture the very high delivery costs in Alaska.

Medicare hospital wage index (WI) and physician geographic practice cost index (GPCI) data were used for the adjustment. Seventy-five percent of care was assumed to vary with the hospital wage index. The remaining 25 percent of care was assumed to vary with the physician GPCI. By law, the published GPCI data reflect only one-quarter of the variation in cost of living across areas. Accordingly, the data were adjusted to reflect the full difference in cost of living before being used for the computation.

The U.S. (all races) population and the AI/AN population in each county were used to calculate weighted averages of these price indices. The weighted average for the U.S. population was 1.0, while for the AI/AN population the weighted average was 0.94. Thus, based on these urban/rural differences in prices, costs for the AI/AN population would be expected to be six percent below the U.S. average.

GEOGRAPHIC INDEX OF HEALTH CARE PRICES (U.S. = 1.00)

Population	Geographic Area	
	<u>Entire US</u>	<u>IHS Service Area</u>
US Population	1.00	0.94
AI/AN	0.94	0.88

For simplicity, the 0.94 figure was applied to all AI/AN population cohorts. If the steeper geographic adjustment were applied to the eligible cohort (AI population in IHS service area), this would reduce the level of need by a further 6 percent, and change the LNF by about half that amount.

IMPACT OF PRICE ADJUSTMENT ON ESTIMATED LNF

	With 6% geographic Adjustment	With 12% percent Adjustment
User Population	.59	0.63
Eligible Population	.54	0.57

§5.6 Benefit Design Options for the Indian Health Service

A key task in this project is to develop one or more “mainstream” health benefit plans that can be considered for the Indian Health Service (IHS). We have identified three benefit plans: Low Option, Standard Option and High Option plans. Only considered here are personal health benefits that are generally covered under employer-sponsored health benefit plans. Not included in the health benefit plans are the wrap-around services provided by the IHS, such as sanitation, and health promotion and education services.

There are several broad categories of health care plans which, to some degree, tend to offer different type benefit packages. The three categories are indemnity plans, PPO plans and HMO (including POS) plans. Traditionally, indemnity plans have used deductibles and coinsurance that apply to most or all covered services, rather than service-specific copayments (e.g. \$10 per office visit.) In addition, indemnity plans generally provide relatively poor coverage for preventive care services, such as well child care and physical examinations. Indemnity plans tend to include limits on mental health and substance abuse services, and may use higher coinsurance rates for these services (e.g. 50 percent) than for medical-surgical services.

HMO plans typically use low to moderate service-specific copayments as their primary member cost-sharing mechanism, and may not use deductibles or coinsurance. Utilization management, rather than member cost sharing, is used as a primary cost containment tool by HMO plans. Copayments tend to be more commonly used for services for which the patient has the greatest discretion to use services (office visits) than for low discretion services (inpatient hospital). Preventive services, such as immunizations, children’s check-ups and adult physical examinations are well covered, often with no copayments. Mental health and substance benefits

are often covered without explicit limits (except number of substance abuse treatment episodes,) although long term therapy is rarely provided.

Benefit plans offered by PPO plans tend to have features that reflect a mixture of indemnity and HMO plan features. PPO plans generally provide better preventive care coverage than indemnity plans but may have cost sharing that includes a combination of deductibles, coinsurance and copayments.

§5.6.1 Indian Health Service Benefit Design Options

We are using the Blue Cross Blue Shield federal employee plan (FEP) as the primary guide in developing IHS benefit plan options. The FEP offers a Standard Option and High Option plan. FEP is structured as a PPO program, although, in some geographic areas there are no separate preferred and participating provider networks. For many services, FEP uses a three tiered relatively complex benefit plan: minimal or no cost sharing for preferred providers, moderate cost sharing for participating providers and substantial cost sharing for non-participating providers.

For most of the primary medical care service categories, services covered under the FEP are the same under both the Standard and High options (e.g. inpatient, outpatient and physician services.) For other services, the number of covered service units is larger for the High than the Standard option (e.g. outpatient mental health and substance abuse therapy, physical therapy.)

Exhibit 1 outlines services covered under three health benefit options for the Indian Health Service: a Low Option, Standard Option and High Option. These benefit designs were developed after review of the FEP health benefit programs, as well as other health benefit designs that are commonly used under employer-sponsored “soft managed care” programs: PPO and managed indemnity programs. In discussions with IHS and consistent with historical and current practices, there is no use of deductibles, coinsurance, or copayments under any of the benefit designs outlined in **Exhibit 1**; even though member cost sharing is used extensively under the FEP plans and under most other mainstream health benefit plans.

The services covered under Standard Option in **Exhibit 1** are the same as those covered under the FEP Standard Option, with two exceptions. We increased the number of substance abuse inpatient treatments covered per lifetime from one (under the FEP) to two, and the number of mental health or substance abuse outpatient therapy visits from 25 per year (under the FEP) to 50 per year. For both these services, we believe that the FEP Standard Option limitations are too restrictive and are inconsistent with current benefit design provisions that we have seen under other programs.

The Low Option benefit design outlined in **Exhibit 1** differs from the Standard Option in that the number of units of covered services is less for selected services: physical and other therapies, mental health and substance abuse services. Also dental benefits are not provided, other than for dental care related to an accidental injury.

The proposed IHS High Option benefit design differs from the Standard Option in that for several services, coverage limits are either increased or eliminated. Also, more comprehensive dental benefits are offered and long term care benefits are included in the High Option.

Under all three options, benefits are restricted to medically necessary services. It is assumed that quality assurance and utilization management procedures are in place to assure that medically necessary services are provided in an appropriate service setting. The only exceptions to the medical necessity rule are for home health and nursing home care benefits offered under the High Option. As indicated above, these benefits cover necessary medical and custodial care services.

EXHIBIT 1

HEALTH BENEFIT OPTIONS FOR THE INDIAN HEALTH SERVICE (All services limited to those deemed to be Medically Necessary)			
Type of Service	Low Option	Standard Option	High Option
Inpatient Hospital	Unlimited days	Unlimited days	Unlimited days
Outpatient Hospital – Freestanding Facility	Unlimited admissions/visits	Unlimited admissions/visits	Unlimited admissions/visits
Professional Services (physicians, podiatrists, audiologists, etc.)	Unlimited visits for diagnostic, curative and selected preventive services	Unlimited visits for diagnostic, curative and selected preventive services	Unlimited visits for diagnostic, curative and preventive services
Physical Examinations	Once every 3 years through age 64, annually 65 and over	Once every 3 years through age 64, annually thereafter	Once every 2 years through age 64, annually thereafter
Physical, Occupational and Speech Therapy	25 physical, occupational and/or speech therapy visits per year	50 physical therapy visits; 25 occupational and speech therapy visits	Unlimited visits
Mental Health – Inpatient	30 days per year	100 days per year	Unlimited days
Mental Health and Substance Abuse – Outpatient Facility	30 days/visits per year	Unlimited days/visits	Unlimited days/visits
Substance Abuse – Inpatient	1 treatment program (28 days) per lifetime	1 treatment program per year (28 day limit); 2 treatment programs lifetime	2 treatment programs per year (28 days); 4 treatment programs lifetime
Mental Health and Substance Abuse – Outpatient Therapy	25 visits per year	50 visits per year	Unlimited visits
Dental Care	Not covered, other than services related to accidental injury	Preventive and basic diagnostic, restorative, endodontic, and periodontic services for children and adults	Comprehensive benefits – diagnostic, restorative, endodontic, periodontic, prosthetics, oral surgery and (limited) orthodontic services
Prescription Drugs	Mandatory formulary covers, generic and limited brand drugs	Unlimited	Unlimited
Home Health Care	25 visits per year (medically necessary)	25 visits per year (medically necessary)	Necessary medical and custodial services

EXHIBIT 1 (CONT.)

HEALTH BENEFIT OPTIONS FOR THE INDIAN HEALTH SERVICE (All services limited to those deemed to be Medically Necessary) (Cont'd)			
Type of Service	Low Option	Standard Option	High Option
Nursing Home Care	30 days skilled nursing facility per confinement (medically necessary)	30 days skilled nursing facility per confinement (medically necessary)	Necessary medical and custodial services
Durable Medical Equipment (DME)	Rental (purchase if less costly) of limited list of DME items	Rental (purchase if less costly) of comprehensive list of DME items	Rental (purchase if less costly) of comprehensive list of DME items
Oral and Other Contraceptives	Diaphragms, intrauterine devices, oral and other contraceptives when prescribed by a physician	Diaphragms, intrauterine devices, oral and other contraceptives when prescribed by a physician	Diaphragms, intrauterine devices, oral and other contraceptives when prescribed by a physician
Vision Care	Not covered	Not covered	One pair of (standard frame) eyeglasses or contact lenses per year
Audiology (Hearing Aids)	Not covered	Not covered	Hearing aid (one per year)

§5.6.2 Member Cost Sharing

Virtually all health benefit plans include member cost sharing in their benefit designs. Member cost sharing is in the form of deductibles, coinsurance and/or service-specific copayments. The primary purpose of member cost sharing is to reduce the health benefit plan cost in the following ways:

- Shifting some portion of claims cost to members
- Providing members with incentives not to demand and use unnecessary services
- Improving member overall health care cost consciousness and providing incentives for cost-effectiveness in use of health care services.

A potential downside of member cost sharing, particularly if required cost sharing is substantial relative to member income and financial resources, is that it may result in reduced medically necessary services in addition to medically unnecessary services. For some individuals, member cost sharing may actually increase health care costs, if they experience serious and costly medical problems as a result of not being diagnosed and treated earlier, as a result inability to pay a portion of the cost of these services.

Despite the potential access barriers that member cost sharing can create, there is a general acceptance of its value and use in health benefit plans. We recognize that as a result of treaty obligations and possibly other factors, there is a long history of not requiring American Indians/Alaskan Natives (AI/ANs) to pay for health care under IHS health care programs. Yet, as proposals are developed for providing AI/ANs with comparable health care benefits to those available to most other Americans, it may be useful to consider incorporating limited cost sharing in these health benefit proposals.

Exhibit 2 outlines two member cost sharing proposals for consideration of use with the health benefit plans described above. The Minimal Copayment plan requires copayments of \$2 for prescription drugs and \$3 for physician office visits and most other outpatient services. The Standard Copayment plan is similar to that used under many managed care plans. Both plans are relatively easy for members to understand, do not use deductibles or coinsurance, and impose less of a financial burden on Plan members than under most indemnity benefit plans.

We have not developed detailed actuarial estimates of the financial implications of the two member cost sharing plans outlined in **Exhibit 2**. However, we estimate that the Minimal Copayment plan will require Plan members to pay 2-4 percent of program costs and the Standard Copayment plan 6-10 of program costs. Total program savings can be expected to be larger, due to members using somewhat fewer, and a more cost-effective mix of services.

EXHIBIT 2

COPAYMENT OPTIONS
(Copayments shown are for Network Providers)

Type of Service	Minimal Copayments	Standard Copayments
Inpatient Hospital	\$25 per admission	\$100 per admission
Outpatient Hospital – Freestanding Facility	\$10 per day/service	\$20 per day/service
Professional Services (physicians, podiatrists, audiologists, etc.))	None for specified preventive services; \$3 per visit for all other	\$10 per visit
Physical Examinations	\$3 per visit	\$10 per visit
Physical, Occupational and Speech Therapy	\$3 per visit	\$10 per visit
Mental Health – Inpatient	\$25 per admission	\$100 per admission
Mental Health and Substance Abuse – Outpatient Facility	\$5 per day/visit	\$20 per day/visit
Substance Abuse- Inpatient	\$25 per admission	\$100 per admission
Mental Health and Substance Abuse – Outpatient therapy	\$3 per visit	\$10 per visit
Dental Care	None for specified preventive services; \$3 per visit for all other	None for specified preventive services; 20% coinsurance for all other; \$2,000 lifetime benefit limit for orthodontia
Prescription Drugs	\$2 per prescription	\$5 per generic prescription; \$10 per brand prescription
Home Health Care	None	None
Nursing Home Care	None	None; benefits subject to maximum payment per day
Durable Medical Equipment (DME)	None	None
Oral and other contraceptives	None	None
Vision Care	\$5 per pair of eyeglasses or contact lenses	\$25 per pair of eyeglasses or contact lenses
Audiology (Hearing Aids)	\$5 per set of hearing aids	\$25 per set of hearing aids

§5.6.3 Cost of Low, Standard, and High Benefits Plans Relative to FEP Standard Option.

Provided below is estimated required premium cost relative to the Standard FEP plan for the three alternative benefit plan designs developed for IHS consideration. The three IHS plans are a Low Option Plan, a Standard Option plan and a High Option plan.

The IHS Low Option plan is similar to the Standard FEP plan, except that fewer physical, occupational and physical therapy visits are covered, and basic dental benefits are not provided. The IHS Standard Option plan differs from the Standard FEP plan in that it provides for increased substance abuse and outpatient therapy benefits. The IHS High Option plan offers comprehensive dental benefits and long term care benefits, neither of which is covered under the FEP plan.

COMPARATIVE PLAN BENEFIT COST

Standard FEP Plan	Low IHS Option	Standard IHS Option	High IHS Option
FEP cost = 100%	95% of FEP cost	103% of FEP cost	115% of FEP cost

The following assumptions are made in developing these cost projections:

- There is assumed to be no induction effect as a result of elimination of any cost sharing under the three IHS plans, i.e. no assumed increased utilization of services
- The covered population is assumed to have the demographic characteristics of the IHS population, rather than of the FEP population.

The low and Standard Option IHS plans are, respectively, only marginally lower and higher in cost than the Standard FEP plan, because the areas of benefit differences (PT/OT/ST, dental and MH/SA services) are for relatively low cost benefits. The cost differential is larger for the High Option IHS plan because long term care benefits are a high cost benefit for those age 65 and over, and for those with disabilities, who would be covered under the IHS benefit plan.

§5.7 Overlap of IHS Spending and FEP Standard Option Benefits Package

A final task for the LNF calculation is to calculate the overlap between IHS spending and the personal health care services in the FEP Standard Option plan. IHS staff calculated the approximate overlap in the following fashion.

First, the line items of the IHS budget were examined to identify those that did not overlap at all with the FEP standard option benefits package. For example, sanitation facilities, public health nursing, and Indian Health professions training and scholarships have no counterpart among the personal health care services in the FEP standard option package.

Next, the line items for health care services were examined, and overlap with the FEP package was estimated. For the largest category of care (Hospitals and Health Clinics), the estimated overlap was 100 percent. For other categories of care, however, estimated overlap was significantly lower. For mental health and alcohol & substance abuse, for example, IHS service levels were estimated to exceed FEP standard option benefits significantly. Thus, for these items overlap between IHS spending and FEP benefits is significantly less than 100 percent.

Finally, overhead and administrative costs, including facilities costs, were pro-rated in proportion to the fraction of other service-delivery costs that overlapped with FEP Standard Option benefits. Thus, 89 percent of such facilities and overhead costs were attributed to overlap with FEP services, and 11 percent were attributed to services not part of the FEP standard option package.

This analysis leads to the following estimated overlap between FEP standard option benefits and IHS spending. Averaged across all spending, 82 percent of the IHS budget overlaps with the FEP Standard Option benefits. Depending on the context, however, spending for Urban Health (shown with zero overlap below) might or might not be included in the overlap with Standard Option benefits. For example, users of these urban facilities are often included in the counts of IHS users. Spending for Urban Health accounts for about 1 percent of the IHS budget. Accordingly, for the analyses above, the more conservative figure of 83 percent overlap was used in the calculation of LNF.

**ESTIMATED OVERLAP
FEP STANDARD OPTION BENEFIT PACKAGE
AND IHS SPENDING**

<u>Services</u>	FY 1998 Appropriation (\$1,000,000's)	Overlap with FEP Standard Option Benefits (Percent)
Hospital and Health Clinics	\$949	100%
Dental Services	71	90
Mental Health	41	50
Alcohol & Substance Abuse	95	77
Contract Health Services	385	90
Public Health Nursing	30	0
Health Education	9	0
Community Health Representatives	46	0
Immunization AK	1	0
Urban Health	26	0
Indian Health Professions	30	0
Tribal Management	2	0
Direct Operation	49	89
Self Governance	9	89
Contract Support Costs	204	89
Maintenance and Improvement	41	89
Sanitation Facilities Construction	89	0
Real Property Depreciation	20	89
Facilities Support	54	89
Environmental Health Support	45	5
OEHE Support	9	89
Medical Equipment	13	100
TOTAL	2,220	82

§6. REFERENCES

Blue Cross Blue Shield Association Federal Employee Program, *Blue Cross Blue Shield Service Benefit Plan 1999*, Washington, DC, Fall 1998.

Blue Cross Blue Shield Association Federal Employee Program, *Operating Results: Enrollment*, Internet Document, www.fepblue.org/enrollment.html, accessed 10/10/1998.

Health Care Financing Administration, *A Profile of Medicare: Chart Book 1998*, Baltimore, MD, 1998.

John, PL, *Native American Health Care, January 1980 – January 1993, Quick Bibliography Series QB93-40*, U.S. Department of Agriculture National Agricultural Library, Beltsville, MD, June 1993.

Levit KR, HC Lazenby, BR Braden, et al., “National Health Expenditures, 1996”, *Health Care Financing Review* 19(1), Fall 1997.

Physician Payment Review Commission, “Competitive Premium Contribution Models: Issues for Medicare”, Chapter 9, *Annual Report to the Congress 1997* (Washington, DC: PPRC, April 1997).

Riley G, C Tudor, Y Chiang, et al., “Health Status of Medicare Enrollees in HMOs and Fee-for-Service in 1994”, *Health Care Financing Review* 17(4):65-76, Summer 1996.

Support Services International, *Adjusting for Miscoding of Indian Race on State Death Certificates*, final report submitted to the Division of Program Health Statistics, IHS, Washington, DC, November 1996.

U.S. Indian Health Service, *Report to Congress on Distribution of IHS Resources to Achieve Equity, In Response to Senate Report 105-56*, Rockville, MD, January 1998.

U.S. Indian Health Service, *Regional Differences in Indian Health 1997*, Rockville, MD, 1997(a).

U.S. Indian Health Service, *Trends in Indian Health 1997*, Rockville, MD, 1997(b).

U.S. Office of Personnel Management, *The Fact Book, 1998 Edition, Federal Civilian Workforce Statistics*, Washington, DC, September 1998.

U.S. Office of Personnel Management, *1998 Federal Employees Health Benefits Program Open Season Highlights*, Press Release, Washington, DC, September 26, 1997.

U.S. Office of Personnel Management, *1999 Federal Employees Health Benefits Program Open Season Runs, Nov. 9--Dec. 14*, Press Release, Washington, DC, September 11, 1998.

U.S. Congressional Budget Office, *Comparing Federal Employee Benefits with Those in the Private Sector*, CBO Memorandum, Washington, DC, August 1998.